

I CLAIM:

1. A wireless protection system for establishing high availability communications, comprising:
 - a wireline link processor for connecting a user site to a network provider site over a broadband access connection;
 - a wireless link processor for connecting said user site and said provider network site over a backup connection;
 - means for monitoring operation of said wireline link and generating a fault signal upon detection of a specified under-performance condition of the broadband access connection; and
 - means for switching user traffic received over said user interface between said wireline and said wireless link according to said fault signal.
2. The system of claim 1, wherein said fault signal indicates one of a failure, performance degradation and overload of the wireline link.
3. The system of claim 2, further comprising at said user site means for filtering said user traffic on receipt of the fault signal for selecting high-priority traffic to be carried over said backup connection.
4. The system of claim 2, further comprising link filtering means at the network provider site for selecting high-priority traffic to be carried to said user site over said backup connection on receipt of said fault signal.
5. The system of claim 2, further comprising:
 - means for filtering said user traffic at said user site on receipt of said fault signal for selecting from said user traffic, the high priority traffic to be transmitted over said backup connection; and

network link filtering means for filtering said user traffic at the network provider site for selecting high-priority traffic to be carried to said user site over said backup connection on receipt of said fault signal.

6. The system of claim 1, wherein said fault signal indicates an overload of said wireline link.

7. The system of claim 6, further comprising:

means for filtering said user traffic at said user site on receipt of said fault signal for selecting from said user traffic the overload traffic to be carried over said backup connection; and

a network provider reconfiguring mechanism for merging said overload traffic back into said user traffic.

8. The system of claim 6, further comprising:

network link filtering means for filtering said user traffic at said network provider site on receipt of said fault signal for selecting said overload traffic; and

a network provider reconfiguring mechanism for separating said overload traffic from said user traffic and routing said overload traffic to said user site over said backup connection.

9. The system of claim 1, wherein said means for switching is a data packet switch for communicatively coupling said user interface to one of said wireless link processor and said wireline link processor under control of said means for monitoring.

10. The system of claim 1, wherein said means for switching is one of a router and an OSI layer 3 switch.

11. The system of claim 1, wherein said means for switching is an OSI layer 2 Ethernet switch.

12. The system of claim 1, wherein said means for switching is a physical layer media switch.

13. A method for protecting a wireline access link, comprising the steps of:

a) transmitting user traffic between a user site and a network provider site in a broadband access connection carried over a wireline link;

b) monitoring integrity of said wireline link and generating a fault signal upon detection of a specified under-performance of said broadband access connection; and

c) switching said user traffic from said broadband access connection to a backup connection according to said fault signal.

14. The method of claim 13, further comprising d) switching back said user traffic from said backup connection to said broadband access connection once said fault signal has been cleared.

15. The method of claim 13, wherein said fault signal indicates one of a failure, performance degradation and overload of said wireline link.

16. The method of claim 15, further comprising filtering said user traffic on receipt of said fault signal for selecting high-priority traffic to be carried over said backup connection.

17. The method of claim 13, wherein said backup connection is a wireless link.

18. The method of claim 17, wherein said step of filtering comprises adapting the bandwidth of said wireline link to the bandwidth of said wireless link by discarding low priority data from said user traffic.

19. The method of claim 17, wherein said step of filtering comprises adapting the bandwidth of said wireline link to the bandwidth of said wireless link by buffering low priority data from said user traffic.

20. The method of claim 15, further comprising filtering said user traffic at the network provider on receipt of said fault signal for selecting high-priority traffic to be carried to said user site over said backup connection.

21. The method of claim 15, wherein said step of filtering comprises one of discarding and buffering low priority data from said user traffic.

22. The method of claim 15, further comprising:
filtering said user traffic at said user site on receipt of said fault signal for selecting from said user traffic, the high-priority traffic to be transmitted over said backup connection; and
filtering said user traffic at said network provider site on receipt of said fault signal for selecting high-priority traffic to be carried to said user site over said backup connection.

23. The method of claim 13, wherein said fault signal indicates an overload condition of said wireline link.

24. The method of claim 20, wherein an overload condition is recognized based on a measured throughput near wireline link capacity.

25. The method of claim 23, further comprising filtering said user traffic at said user site on receipt of said fault signal for selecting from said user traffic, the overload traffic to be carried over said backup connection.

26. The method of claim 23, further comprising, merging said overload traffic back into said user traffic at said network provider site.

27. The method of claim 23, further comprising, at said network provider site: filtering said user traffic on receipt of said fault signal for selecting said overload traffic; and routing said overload traffic to said user site over said backup connection.

28. The method of claim 13, wherein said fault signal is generated based on signaling of link configuration or availability using the 802.3ad Ethernet link aggregation protocol.

29. The method of claim 13, wherein said step c) is based on signaling of link configuration or availability within the IETF RFC 1717/RFC 1990 Multi-link Point to Point protocol.

30. The method of claim 13, wherein said fault signal is generated based on detection of a loss of signal, absence of a signal within a time-out interval, or a failure to respond to an active health test condition.

31. The method of claim 13, wherein said fault signal is generated in response to a degraded performance detected on said wireline link.

32. The method of claim 31, wherein said degraded condition includes an increased bit error rate, packet loss, excessive latency, or jitter.

33. The method of claim 17, wherein said fault signal is generated based on user-programmable link preferences.

34. The method of claim 31, wherein said user-programmable link preferences include a usage quota on the wireline link.

35. The method of claim 33, wherein said user-programmable link preferences include dividing the total bandwidth between said user site and said provider network into a first bandwidth for said wireline link and a second bandwidth for said wireless link.

36. The method of claim 13, further comprising maintaining said wireline link always available for traffic.

37. The method of claim 17, further comprising maintaining said wireless link available only on request.

38. The method of claim 17, further comprising maintaining said wireline link unavailable when traffic is switched over said wireless link.

39. The method of claim 38, further comprising maintaining said wireless line link unavailable when traffic is switched over said wireline link.

40. The method of claim 14, wherein said step d) comprises transmitting test data over said wireline link to determine recovery of said broadband access connection.

41. The method of claim 40, wherein said test data comprises one of low-priority user traffic and test probes.

42. The method of claim 14, further comprising switching back said user traffic from said backup link on said wireline link at specific intervals and determining if said fault signal has been cleared.

43. The method of claim 39, wherein said time intervals increase progressively to reduce the impact of testing on traffic performance.

44. The method of claim 16, wherein said high priority traffic is selected by means of policing or shaping low priority traffic at said user site when traffic presented exceeds the available upstream link capacity.

45. The method of claim 16, wherein said high priority traffic is selected by means of policing or shaping low priority traffic at said network provider site when traffic presented exceeds the available upstream link capacity